Amendments to the Specification:

Please amend the specification as follows.

Page 1, delete the title and amend the first paragraph as follows:

BACKGROUND OF THE INVENTION

The invention relates to a method for automatic fault detection by crack detection by the dye penetrant method, whereas workpieces for the dye penetrant test being treated with penetrant containing dye, so that the dye concentrates at surface faults, and, after a predetermined development period, being recorded by at least one image recording device and the recordings being evaluated with regard to faults in an image processing unit by scanning and detecting areas with a concentration of dye, faults being detected and corresponding signals are output.

Page 2, amend the third complete paragraph and the paragraph bridging Pages 2 and 3 as follows:

19645377.1 proposes automatically checking the change in the setting of image recording devices, such as the focus or of the geometric arrangement of the recording device in relation to the test specimen, which are easily changed; ~~15~~ likewise, further parameters which have a significant influence on the testing, such as the quality of the cleaning agent, the testing liquid, the pickling agent and the temperature.

In the case of the known method, already both the testing method and its limits, testing errors and its handling, performance delimitation, tolerance information and so on, which are desired nowadays, are monitored, and a recording and/or documentation of the results and the reproducibility of the results - that is to say the detection of the functional content of the detection system itself is also ensured. This provides additional security if in testing Systems, in particular automatic testing systems, ~~ov.er~~ over a relatively long operating period, there are points of view ~~30~~ relating to reducing the costs or increasing the certainty that workpieces to be classified as faulty could be evaluated more reliably.

Page 3, amend the first complete paragraph as follows:

By means of the regular passing of so-called test bodies with predefined test faults, it is possible ~~35~~ to determine whether these have still been correctly detected - but by this method it was only possible to establish that the test body was not detected, but not why it was not detected. Since no documentation was created, it was not possible either to demonstrate the point at which the system no longer operated satisfactorily and why.

Page 4, amend the third paragraph (lines 12-13) as follows:

SUMMARY OF THE INVENTION

According to the invention, the object is achieved by a generic method having the steps:

Page 4, amend the last paragraph as follows:

Advantageous developments emerge from the ~~dependent claims~~ detailed description hereinbelow.

Page 5, amend the first paragraph as follows:

Since the dynamic behavior of the dyes concentrated at surface discontinuities is now reliably ~~aquired~~ acquired and evaluated, completely new evaluation of the surface faults is possible. The ~~aquisiation~~ acquisition of the time behavior of the fault indication by means of image-processing methods as a result of recording at time intervals and calculating the differences in contrasts makes it possible, as a result of automatic evaluation on the part of the data processing system of the differences between the recordings made at various times, to classify faults, to evaluate them and, accordingly, to output an indication with faults of a specific type.

Page 7, amend the fourth paragraph (lines 22-25) as follows:

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention will be explained in more detail below using the schematic drawing, the invention in no way being limited to this embodiment, but any desired further embodiments being familiar to those skilled in the art. In the drawings:

Page 8, amend the second, third and fourth paragraphs and the paragraph bridging Page 8 and 9 as follows:

DETAILED DESCRIPTION

As can be seen from Fig. 1, in the crack testing method by the dye penetrant method a ~~specimes~~ specimen to be tested - most often nonferritic - is pre-cleaned, if necessary pickled and dried and then treated with a testing agent - also referred to as a dye penetrant agent. The excess dye penetrant is removed after a specific time period, the workpieces intermediately cleaned and then treated with a developer solution. After the development time, the workpiece is dried, if necessary, and inspected at various times and then, on the basis of the different recordings at different times, statements ~~aremade~~ are made about the faultiness of the workpiece, which are also documented, if appropriate.

As can be seen from Fig. ~~1~~ 2, a developed workpiece 10 is led as a specimen into a testing station in which the application of the dye penetrant by spray nozzles from a dye penetrant tank 12 is illustrated schematically - in actual fact, the specimen passes through other stations, in which it is treated with cleaning and pickling solutions and developer solutions and dye solutions, which are not illustrated here. Provided in-line in the line leading ~~5~~ to the spray heads is a testing agent checking and metered redosing system 17, preferably one in accordance with DE-A-4438510.2.

There, the testing agent is checked for operativeness and, if necessary, dye or the like can ~~10~~ be metered into the tank 12, if this is necessary. In the case of this embodiment, which operates with fluorescent dye, the specimen is irradiated by means of a UV lamp 11, which in turn can be monitored in a manner known per se and its current can be readjusted accordingly.

From a storage container 12 (by means of a spray in simpler embodiments), which is connected to a circulating pump, testing liquid ~~13a~~, which is used to mark the surface faults, is fed via a feed line by means of spray heads 13 of a spraying system and atomized over the surface of the workpiece 10. The testing liquid distributes over the workpiece, the dye particles - as is generally known as a physical phenomenon - being concentrated at cracks by surface tension. An increased particle concentration therefore arises at these locations. The excess testing liquid is removed, for example by wiping. The specimen is then process with a developer liquid. After a development time - to be determined experimentally for each testing arrangement and specimen - the surface of the workpiece 10 is irradiated by a lamp 11, as a result the particles in the testing liquid are caused to fluoresce or absorb, and the particles of die which become concentrated in the area of the surface cracks are recorded by a camera 16, and this recording is stored in the image processing system 22. After a time interval of about 20 - 150 seconds, a second recording is made, which is likewise stored in the image processing system 22. These two recordings are now compared with each other by evaluation logic in the

image processing unit, and the time interval is assigned to the comparative value. If appropriate, further recordings can also be made at other times and processed. The calculated comparative values are then compared, in the evaluation logic, with a stored reference-value table and in this way it is established whether the image change values lie within a predetermined range or above a predetermined threshold value. Accordingly, a fault indication can then be output by the evaluation logic, and can lead to classification or to the rejection of the measured part. Preferably associated with the operativeness of the system is a self-checking device for the monitoring or self-monitoring of associated operating parameters, that is to say keeping of the respective operating variables within the prescribed value interval. Such a self-checking system can, if the checking values are outside a desired measured value range, readjust within specific limits - as a result, unnecessary material waste, such as occurs as a result of the premature replacement of the marking agent or as a result of the premature, routine replacement of the illumination means, such as a UV lamp or the like, can be avoided. This increases the service life of the testing system considerably, it can run for a longer period without interruption, and the associated operating costs, as well as those for material and power, are consequently likewise reduced. The self checking device 14 is preferably connected to a documentation device 30, in which it produces test reports, using which the operativeness of the system can be verified.

Amend the paragraph bridging Pages 9 and 10 as follows:

A further embodiment of a system for carrying out a method according to the invention is illustrated in Fig. 3. In this case, groups of measuring units 16, ~~161, 1611~~ 16', 16'' can output their recordings, which are fed to the respective input of an image processing unit 22. In this case, at least two recordings of each workpiece 10 are made at different times, and the differences between the two recordings is determined - for example by subtraction. These differences can be fed, for example, into a visual display unit 20 or else into a sorting device 25 connected downstream, which automatically separates parts classified as poor.